

## Constraints on the Optical Properties of Possible Source Regions for ALH84001 and Other Martian Meteorites

L.A. McFadden (U. of Maryland), N.G. Barlow (U. of Central Florida),

The petrology of martian meteorites, especially their predominance of mafic silicate minerals (pyroxene and olivine) and cumulate textures, results in laboratory reflectance spectra which are unique among the meteorites. Their spectral signatures can be readily interpreted in terms of crystal field theory. An obvious question is whether or not such distinguishing spectral features can be extracted from measurements made with orbiting spacecraft to target sites from which to search for fossil evidence of life and to establish ground-truth with Mars? Previous work indicates the answer is yes (Sunshine et al. 1995, Mustard and Sunshine, 1995). Possible craters from which these meteorites have been ejected have been cited (Barlow, 1996, Mouginis-Mark et al. 1992) using the meteorites' ejection ages derived from isotopic analysis. With laboratory spectra of the meteorites we can place further constraints on the optical properties of the most probable source regions. With the filter set included with the Mars Pathfinder Imager, the exposed rock signature of regions that are mineralogically similar to ALH84001, ALH77005, the three lithologies of EETA79001, and the SNC meteorites are different and distinguishable. If the sites from which the meteorites were ejected can be located and studied directly, then ground-truth will be established for Mars allowing an absolute age to be placed on martian cratering chronology, and a link between meteorite geochemistry and remote sensing measurements to be established. The arguments over priorities in selecting a site for a returned sample will be heated as the region from which the meteorites were ejected would also have been heated and evidence of life likely to have been destroyed in the fall back process.

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Paper presented by Lucy A. McFadden

Astronomy Department

University of Maryland

College Park MD 20742-2421 USA

Phone: 301-405-2081

Fax: 301-314-9067

Email: mcfadden@astro.umd.edu

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